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To: Mr. J. S. Crichton Date: September 22, 1981

From: D. A. Lowitz

Subject: Current Investigations in the Precoated Tipping Program

Based on previous T&D tests, thermal stability tests, machinability tests, and laser perforation machinability, it was decided to subject the Ecusta precoated tipping paper candidate to a POL test. Test and control cigarettes were made and were found to compare favorably in terms of RTD, dilution, weight and delivery. Some of the POL samples were submitted to the P&D and Manufacturing flavor panels to ascertain that they were reasonably Marlboro-like. However, contrary to previous T&D tests, the flavor panels found significant differences between the test and control cigarettes. We subsequently learned from Ecusta that although the material used for the tipping paper adhesive coating was the same as that previously used, it was from a new batch obtained from their supplier.

Subsequent to these findings, we formulated the following strategy:

a) Remake cigarettes with Ecusta precoated paper involving three different Ecusta shipments and three different batches of adhesive coating material. Have the P&D and Manufacturing flavor panels compare them with a control and with each other.

b) Make tipping wrapped plugs using our standard adhesive and also using all available Ecusta, Milprint and Golden Belt candidates. Subject these plugs, on mild heating (120°F), to both subjective and instrumental head space analysis to determine their potential for introducing material into the smoke that would have a subjective impact.

c) Make cigarettes of two new candidate materials supplied by Milprint, and two new materials supplied by Golden Belt. Subject these cigarettes to tests of machinability, T&D, thermal stability, general tailoring quality, and laser perforating machinability. The two new materials from Golden Belt are different from their previous candidate materials, but they would not reveal their compositions, only that they meet FDA specifications. One of the new Milprint candidates is essentially the same as their previous Elvax based candidate, but there is no butyl rubber component. Also, it was applied with a commercial "curtain coater" to provide a more uniform coating than before, and to provide more cross-linking in the polymer, due to the greater temperature during application, for improved thermal stability. The second new Milprint candidate uses a PVA supplied by Polymer

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Industries. The PVA candidate should most closely resemble our current adhesive in terms of subjective impact and thermal stability. Its processing should also differ considerably from the other candidates as it's relatively very fast tacking, has a higher softening temperature, and can be water activated.

Work on this strategy has been initiated, and we have accomplished the following:

a) Cigarettes have been made of the three Ecusta coating batches along with a control. Arrangements have been made for them to be smoked by the R&D and Manufacturing flavor panels.

b) Tipping wrapped plugs have been made with our standard adhesive and with all the precoated tipping paper candidates available. Arrangements are in progress of being made to have them subjected to subjective and instrumental head space analysis.

c) Cigarettes were made of the new Milprint "Elvax" coated candidate which will shortly be treated according to the program strategy. The Milprint PVA material was more difficult to handle, but after several false starts we learned how to make cigarettes with it. This will be described in more detail in a later section. The Golden Belt candidates could not be used to make cigarettes, and we later found the coatings to be too thin to be practical. Golden Belt will supply us with thicker coatings of the same type in the near future.

The machining technique for using the Milprint PVA coated tipping is quite different from that of the other candidate materials. In all the other cases we obtained the best results on the PA-8 with the preheater and the roll-hand temperatures low, and with the postheater and cork-drum temperatures at intermediate levels. In order to obtain good cigarettes with the PVA candidate, it was necessary to have the roll-hand at very high temperature, as well as the cork-drum and postheater. We found that running at the same temperature as in the other cases produced excellent tip-to-tip seals, but very poor tip-to-rod and tip-to-plug seals. To obtain good tip-to-rod seals, it was necessary to apply greater roll-hand pressure, use the altered temperature profile described in the preceding, and run at slower speed for greater heat input. After learning how to use the material, cigarettes were produced that appear excellent in tailoring quality, have the best tip-to-tip seam of any of the precoated tipping candidates, and we believe have less potential for T&O problems than any other candidate material due to the compositional similarity of the PVA coating to our current adhesives.

Our plans for improving the machining speed of the PVA coating follow two routes:

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a) Investigate taking advantage of the water activation capability of the PVA to make it slower tacking and to minimize the requirements for extra high temperature. This appears promising as the tip-to-tip seal is excellent at low temperature, apparently due to the activation of the inked side of the paper when the material is in bobbin form.

b) Explore modifying the structure of the roll-hand so that there are two raised regions on its surface that would apply greater pressure in the location of the tip-to-rod seal without deforming the surface of the rod paper.

Work on the new candidate following the preceding strategy is now being initiated.

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